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Systematic Studies of Asian *Saussurea* (*Asteraceae*) III. *Saussurea fuboensis*, a New Species from the Southernmost Part of Tohoku District, Northern Japan

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A new species, *Saussurea fuboensis* Kadota, is described from the southern part of Tohoku District, northern Japan. *Saussurea fuboensis* is related to *S. nikoensis* Franch. & Sav. but is distinguished from it by having arachnoid, cylindrical involucres less than 1 cm in diam., throats of florets 1 mm long, narrowly winged stem, broadly ovate leaf blades, ascending involucral phyllaries, and narrowly ovate outer involucral phyllaries 2 mm wide at base. *Saussurea fuboensis* grows in meadows and along *Pinus pumila – Alnus maximowiczii* scrubs in the alpine zone of the southernmost part of the Owu Mountain Range, Tohoku District. (Continued from J. Jpn. Bot. **83**: 284–294, 2008)

Key words: Japan, new species, Owu Mountain Range, *Saussurea fuboensis*, *Saussurea nikoensis*.

This is part of a revision of Asian *Saussurea* (*Asteraceae*) (Kadota 1987, 2004, 2007, 2008).

A *Saussurea* has been hitherto known in the alpine zone of the southern part of the Owu Mountain Range, Tohoku District, northern Honshu, Japan. It was treated variously in the monographs and the local floras; *S. brachycephalla* Franch. (Yuhki 1934, 1972, 1992, Kitamura 1935, 1937, Flora of Miyagi-Prefecture 1935, Natural History of Shiroishi, Miyagi Pref. 1983, Flora of Miyagi Prefecture 2001), *S. franchetii* Koidz. (Yuhki 1934, 1972, 1992, Kitamura 1935, 1937, Flora of Miyagi-Prefecture 1935, Natural History of Shiroishi, Miyagi Pref. 1983, Flora of Miyagi Prefecture 2001), or *S. nikoensis* Franch. var. *sessiliflora* (Koidz.) Kitam. (Yuhki 1943, 1972, 1992, Flora of Fukushima Prefecture 1987, Baba et al. 1988). However, based on field and herbarium examinations, it is clarified that the *Saussurea* plants at issue belong to a single species that is not attributed to any of the above-stated three species. Here I describe the species as *S. fuboensis* after the locality name, Mt. Fubô-san, where this new species is most abundant.

Taxonomic treatment

Saussurea (sect. *Lagurostemon* ser. *Intermediae*) **fuboensis** Kadota, sp. nov. [Figs. 1, 2]

Saussurea brachyphylla auct. non Franch.: Kitam. in Mem. Coll. Sci., Kyoto Imper. Univ., ser. B (Compos. Jap. I) **13**: 157

Fig. 1. Habit and capitulum of *Saussurea fuboensis* Kadota (JAPAN: Honshu, Miyagi Pref., Shiroishi-shi, the Zawo Mountains, Mt. Fubô-san, 15 September 2008). Left corner inset shows a capitulum from the same locality.

(1937), pl. ex “Karitoyama” [= Mt. Gando-san], Mt. Funagata et Mt. Fubo.

Saussurea franchetii auct. non Koidz.: Kitam. in Mem. Coll. Sci. Kyoto Imper. Univ., ser. B (Compos. Jap. I) **13**: 156 (1937), pl. ex Mt. Azuma.

Saussurea nikoensis Fanch. & Sav. var. *sessiliflora* (Koidz.) Kitam. in Mem. Coll. Sci. Kyoto Imper. Univ., ser. B (Compos. Jap. I) **13**: 158 (1937), pl. ex Mt. Azuma.

Differt a *Saussurea nikoensi* involucris arachnoideis cylindricis minus quam 1 cm diametro, faucibus flosculorum 1 mm longis, alis caule angustatis, laminis foliorum late ovatis, phyllariis involucrorum ascendentibus, phyllariis exterioribus involucrorum anguste ovatis basi 2 mm latis.

TYPE: JAPAN: Honshu, Miyagi Pref., Shiroishi-shi, Fukuoka Yatsumiya, the Zawo Mountains, Mt. Fubô-san [38º04’30.2”N 140º28’51.8”E], alt. 1642 m, 15 Sept. 2008, Y. Kadota 085421 (TNS 777879–holotype, Fig. 2).

A medium-sized, herbaceous perennial, 40–60 cm tall. Rhizome oblique, 0.3–1.3 cm in diameter, with string-like roots. Stem erect, striate, narrowly winged, glabrous or sparingly pubescent with brownish multicellular hairs, 1–5 times branched; wings 1–2 mm wide. Basal leaves withering at anthesis. Lower cauline leaves coriaceous, broadly ovate to triangular-ovate or ovate, 7.5–14 cm long, 7–9 cm wide, coarsely dentate, glabrous or sparingly pubescent with short, brownish, multicellular hairs on both sides, cordate to shallowly cordate at base, acute to acuminate at apex; petioles 5–12 cm long, glabrous or sparingly pubescent with short, brownish, multicellular hairs, winged in the upper half. Middle and upper cauline leaves ovate, 3–5 cm long, 2–3 cm wide, serrate, truncate to cuneate at base, acuminate at apex, similarly pubescent to the lower cauline leaves, shortly petiolate, amplexicaul; petioles winged. Flowers in (July to) August to September, with 2–3 capitula, arranged in a compact corymb; peduncles 0.3–2 cm long in the terminal corymb, ascending at an acute-angle, densely pubescent with brownish, multicellular hairs. Involucres cylindrical, 8–15 mm in diameter, 12–16 mm long, blackish purple, sparingly arachnoid; phyllaries 6-seriate; outer phyllaries narrowly ovate, 7–12 mm long, ascending, acuminate; inner phyllaries lanceolate, 10–12 mm long, acuminate; setae 6 mm long; subtending leaves 3–4, narrowly ovato-lanceolate, 6–15 mm. Corollae pale violet, 12–13 mm long; lobes 4 mm long; throats 1.5 mm long; tubes 5–6 mm long; anthers 6 mm long, deep bluish purplish. Pappi 2-whorled, grayish white; outer 3 mm long; inner 8–9 mm long. Achenes 4.5 mm long, light gray, purplish-striated and/or spotted, striate, glabrous.

Japanese name: Fubô-tôhiren (nov.).

和名：フボウトウヒレン（新称）

Distribution: Miyagi, Yamagata and Fukushima Prefs., Honshu, Japan (Fig. 3). Endemic to Japan. Growing in meadows and along *Pinus pumila – Alnus maximowiczii* scrubs of the alpine and subalpine zones.

Additional specimens examined: JAPAN: Honshu; **Miyagi Pref**., Kami-gun, Shikama-cho, Koguriyama, Ôyachi, Mt. Funagata-yama, the summit area [38º27’18.9”N 140º37’10.6”E], alt. 1487 m, 14 Sept. 2007, Y. Kadota 085301–085325 (TNS 777891–777915); Sendai-shi, Mt. Funagata-yama [= Mt. Goshozan], 30 July 2008, N. Takahashi No. 1 (TNS 777599). Katta-gun, Zawo-cho, the Zawo Mountains, Mt. Minami-Byôbu-dake, 22 Aug. 1985, N. Takahashi No. 2 (TNS 777598). Senda-shi, Mt. Izumiga-take, 28 Aug. 1949, J. Haginiwa 017033 (TNS 967033).

Fig. 2. *Saussurea fuboensis* Kadota (JAPAN: Honshu, Miyagi Pref., Shiroishi-shi, the Zawo Mountains, Mt. Fubô-san, the summit area, an alpine meadow, alt. 1642 m, 15 September 2008, Y. Kadota 085421, TNS 777879, holotype).

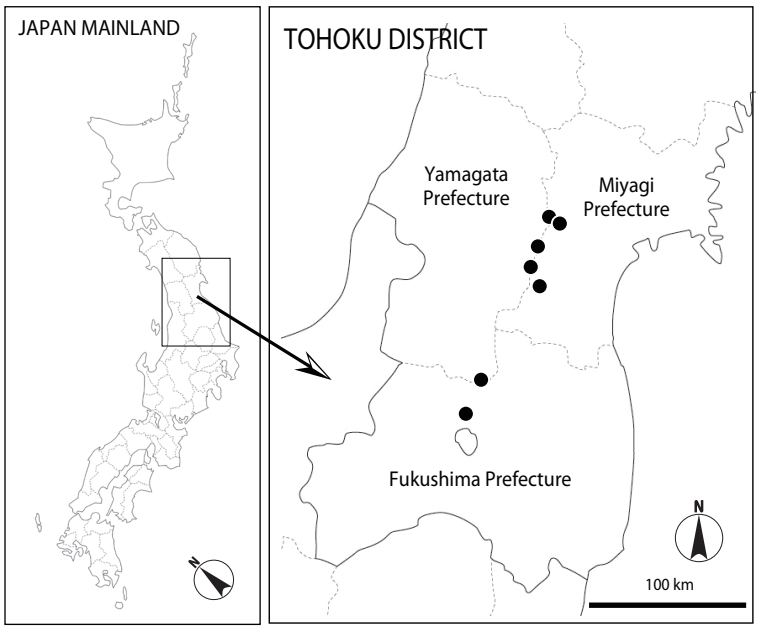

Fig. 3. Distribution of *Saussurea fuboensis* Kadota.

Shiroishi-shi, the Zawo Mountains, south slope of Mt. Fubo-dake [= Fubô-san], alt. 900–1700 m, 7 Aug. 1983, H. Nishimura 832 (TNS 445329); Mt. Fubô-san, Kôbô-Shimizu, alt. ca. 1320 m, 10 Oct. 2006, Y. Ueno 45375 (TNS 769822); Mt. Fubô-san, Kôbô-Shimizu, alt. ca. 1325 m, 10 Oct. 2006, Y. Ueno 45376 (TNS 769821); Mt. Fubô-san, alt. ca. 1635 m, 10 Oct. 2006, Y. Ueno 45377 (TNS 769820); Mt. Fubô-san, summit area [38º04'31.7"N 140º28'41.2"E], alt. 1679 m, 15 Sept. 2008, Y. Kadota 085401–085413 (TNS 777866–777878); Mt. Fubô-san [38º04'30.2"N 140º28'51.8"E], alt. 1642 m, 15 Sept. 2008, Y. Kadota 085414–085420 (TNS 777880–777886); Mt. Fubô-san, Kôbô-Shimizu [38º04'08.3"N 140º29'44.5"E], alt. 1180 m, 15 Sept. 2008, Y. Kadota 085422–085423 (TNS 777887–777888); Mt. Midzuhiki-Nyûdô, alt. ca. 1600 m, 25 Oct. 2008, Y. Ueno 46292 (TNS 778268–778269). **Yamagata Pref**., Yamagata-shi, Sekisawa, Mt. Hamaguri-yama, 24 Aug. 2005, N. Takahashi 2588 (TNS 777596); Yamagata-shi, Mt. Gando-san, 27 Sept. 2005, N. Takahashi 3598 (TNS 777595; the left plant), 3599 (TNS 777597). **Fukushima Pref**., Mt. Bandai-san, 19 Aug. 1922, M. Kato (H. Koidzumi 83426) (TNS 176045); Mt. Bandai-san, 7 Aug. 1937, Z. Tashiro s.n. (TNS 58064). Yama-gun, Mts. Azuma-san, 30 July 1971, M. Shimizu 1012 (TNS 654278); Inawashiro-machi, the Azuma Mountains, Yachidaira, Ôkurafukasawa, alt. 1500 m, 4 Sept. 2004, K. Hasunuma 27499 (TNS 775857–775858); Inawashiro-machi, Mt. Banda-san, alt. 1500 m, 20 Sept. 2008, K. Hasunuma s.n. (TNS 776239); Mt. Banda-san, Kôbô-Shimizu, alt. 1600 m, 20 Sept. 2008, K. Hasunuma s.n. (TNS 776238); Mt. Bandai-san, the summit area (Oshitate side), alt. 1800 m, K. Hasunuma s.n. (TNS 776234–776237). Kita-Shiobara-mura, the Azuma Mountains, Mt. Nishi-Daiten, just below the summit, alt. 1970 m, 6 Sept. 2008, K. Hasunuma s.n. (TNS 775862–775864).

Saussurea fuboensis is distinguished from *S. nikoensis* Franch. & Sav. by having arachnoid, cylindrical involucres less than 1 cm in diam., throats of florets 1 mm long,

narrowly winged stem, broadly ovate leaf blades, ascending involucral phyllaries, narrowly ovate outer involucral phyllaries 2 mm wide at base and subtending leaves slightly longer than the outer involucral phyllaries.

Saussurea brachycephala Franch. is different from *S. fuboensis* by having campanulate involucres, adpressed, narrowly ovate outer involucral phyllaries almost equal to the inner ones in length, and clearly winged petioles. *Saussurea brachycephala* is endemic to Mts. Iwate-san and Hayachine-san, Iwate Prefecture, northern Honshu.

Saussurea franchetii Koidz. is distinguished from *S. fuboensis* by having campanulate involucres, narrowly ovate outer involucral phyllaries almost equal to the inner ones in length and glomerate capitula. *Saussurea franchetii* is distributed in the Tohoku mountains situated on the Japan Sea side (Mt. Akita-Komaga-take to Mt. Yakeishi-dake, Mts. Gassan, and Asahi Mountains). Both *S. brachycephala* and *S. franchetii* differs significantly from *S. fuboensis* by 5-seriate involucral phyllaries and long, subtending leaves at the base of involucres.

Saussurea sessiliflora (Koidz.) Kadota, **stat**. **nov**. [basyonym: *S. tanakae* Franch. & Sav. ex Maxim. var. *sessiliflora* Koidz. in Bot. Mag. (Tokyo) **29**: 115 (1915) – *S. nikoensis* Franch. var. *sessiliflora* (Koidz.) Kitam. in J. Coll. Sci. Kyoto Imper. Univ., Ser. B **13**: 158 (1937). TYPE: JAPAN: Honshu; Ishikawa Pref., Mt. Hakusan, 8 Aug. 1881, R. Yatabe & J. Matsumura 110, TI –holotype !; LE–isotype] is characterized by 6-seriate involucral phyllaries but discriminated from *S. fuboensis* by globular-campanulate involucres and short peduncels (frequently heads are sessile). *Saussurea sessiliflora* is distributed in the mountains from northern Kanto to northern Chubu Districts (mainly on the Japan Sea side), central Honshu, Japan.

Within the range of *S. fuboensis* another species, *S. sendaica* Franch. (= *S. nipponica* Miq. subsp. *sendaica* (Franch.) Kitam.) grows in the places of lower elevation (lower than 1000 m above sea level). *Saussurea fuboensis* and *S. sendaica* are therefore vertically segregated from each other in the southern part of the Owu Mountain Range.

Literatures cited

Aomori Region Forestry Office (Murai S.) 1935. *Saussurea*. Flora of Miyagi-Prefecture. 188 pp. (*Saussurea*, p. 136). Aomori Region Forestry Office, Aomori (in Japanese).

Baba A., Saito S. and Sakashita S. 1988. *Saussurea*. Bandai-san Yûkoku-no-Shokubutsu [Plants of Mt. Bandai-san and Yûkoku]. 212 pp. (*Saussurea*, p. 67, photo 376, pp. 117, 211). Rekishi Shunjû-sha, Aidzu-Wakamatsu (in Japanese).

Kadota Y. 1987. A new variety of *Saussurea kudoana* Tatewaki et Kitamura (Asteraceae) from Hokkaido, Japan. Mem. Natn. Sci. Mus., Tokyo (20): 83–90.

Kadota Y. 2004. A new species of *Saussurea* (*Asteraceae*) from Honshu, Japan. J. Jpn. Bot. **79**: 235–240.

Kadota Y. 2007. Systeamtic studies of Asian *Saussurea* (*Asteraceae*) I. *Saussurea kubotae*, a new species from western Japan. J. Jpn. Bot. **82**: 259–265.

Kadota Y. 2008. Systeamtic studies of Asian *Saussurea* (*Asteraceae*) II. Two new species from Aomori Prefecture, northern Japan. J. Jpn. Bot. **83**: 284–294.

Kitamura S. 1935. Les Saussurées du Japon; leur classification et leur distribution. Acta Phytotax. Geobot. **4**: 1–14.

Kitamura S. 1937. Compositae Japonicae. Pars prima. Mem. Coll. Sci. Kyoto Imp. Univ., ser. B, **13**: 140–212.

Miyagi-ken Shokubutsu-shi Henshû Iinkai (Kimura C., representative) 2001. *Saussurea*. Flora of Miyagi Prefecture 2000. 378 pp. (*Saussurea*, pp. 258–259). Miyagi Shokubutsu-no-kai and Miyagi-ken Shokubutsu-shi Henshû Iinkai, Ishinomaki (in Japanese).

Shiroishi-shi Shokubutsu-shi Kankô-kai (Suzuki R., representative) 1983. *Saussurea*. Natural History of Shiroishi, Miyagi Pref. 256 pp. (*Saussurea*, p. 151). Shiroishi-shi Shokubutsu-shi Kankô-kai, Shiroishi (in Japanese).

The Compilation Committee of Flora of Fukushima Prefecture (Suzuki S., editorial supervisor) 1987.

Saussurea. Flora of Fukushima Prefecture. 481 pp. (*Saussurea*, p. 369). The Compilation Committee of Flora of Fukushima Prefecture, Iwaki (in Japanese).

Yonekura K. and Kajita T. 2003–2009. *Saussurea*. BGPlants (YList). http://bean.bio.chiba-u.ac.jp/bgplants/ylist_main.html.

Yuhki Y. 1934. *Saussurea*. Florula Yamagata-praefecturaeana sive Enumeratio Plantarum Omnium in Praefectura Yamagata Sponte Crescentium. pp. 141 (*Saussurea*, pp. 105–106). Yamagata (in Japanese).

Yuhki Y. 1972. *Saussurea*. Flora of Yamagata. pp. 401 (*Saussurea*, pp. 329–330). Members of Flora Yamagata, Yamagata (in Japanese).

Yuhki Y. 1992. *Saussurea*. New Flora of Yamagata. pp. 487 (*Saussurea*, pp. 286–287). Members of Flora Yamagata, Yamagata (in Japanese).

門田裕一：アジア産トウヒレン属（キク科）の分類学的研究 Ⅲ．東北地方南部からの 1 新種，フボウトウヒレン

トウヒレン属（キク科）の 1 新種，フボウトウヒレン *Saussurea fuboensis* Kadota を記載した．フボウトウヒレンはシラネアザミ *S. nikoensis* Franch. & Sav. に近縁であるが，以下のような特徴で区別される．①頭花はより小さく，筒状で，複散房花序につき，②小花の広筒部は長さ約 1 mm，③茎には翼があるが，幅狭く目立たず，④茎葉の葉身は広卵形，⑤総苞片は斜上し，⑥総苞外片は狭卵形で基部で幅 2 mm となる．

フボウトウヒレンは奥羽山脈南部（船形山系，蔵王山系，吾妻連峰，磐梯山）に分布し，高山帯の草原やハイマツやミヤマハンノキを主体とする灌木林の林縁に生える．奥羽山脈南部では低所にセンダイトウヒレン *S. sendaica* Franch. (= *S. nipponica* Miq. subsp. *sendaica* (Franch.) Kitam.) が生育し，両種は垂直的に棲み分けている．

フボウトウヒレンの存在自体は以前から知られており，イワテヒゴタイ *S. brachycephala* Franch.（Kitamura 1935, 1937, 山形縣植物誌 1934, 山形県の植物誌 1972，新版山形県の植物誌 1992, 宮城県植物目録 1935, 白石市植物誌 1983, 宮城県植物目録 2000　2001 など）やミヤマキタアザミ *S. franchetii* Koidz.（Kitamura 1935, 1937, 山形縣植物誌 1934，山形県の植物誌 1972，新版山形県の植物誌 1992, 宮城県植物目録 1935, 白石市植物誌 1983, 宮城県植物目録 2000　2001 など），あるいはクロトウヒレン *S. sessiliflora* (Koidz.) Kadota, **stat**. **nov**. [= *S. nikoensis* var. *sessiliflora* (Koidz.) Kitam.]（福島県植物誌 1987，馬場ら 1988）などと混同されてきた．しかしながら，フボウトウヒレンはこれらの 3 種とは次のように異なる．イワテヒゴタイは，総苞は筒形，総苞外片は狭長卵形，内片より長く，圧着し，茎葉は長卵形で葉柄に明瞭な翼がある点でフボウトウヒレンと異なる．イワテヒゴタイは岩手県岩手山と早池峰山の固有植物である．ミヤマキタアザミでは総苞は鐘形でクモ毛が多く，総苞外片は長卵形で基部は幅広く，内片と等長あるいは長く，斜上し，頭花の柄が短いため頭花が密集する傾向がある．ミヤマキタアザミは東北地方日本海側の山地（秋田駒ケ岳, 焼石岳, 月山, 朝日連峰）に分布する．イワテヒゴタイとミヤマキタアザミは共に総苞片は 5 列で，頭花の基部に長い苞葉がある点でもフボウトウヒレンと異なっている．

一方，クロトウヒレンは総苞片はフボウトウヒレンと同じく 6 列であるが，総苞は球状鐘形で，総苞外片はさらに幅広く（基部で幅 3–4 mm），頭花の柄が短く頭花が密集することでフボウトウヒレンと区別される．クロトウヒレンは中部地方北部にかけての日本海側山地（頸城山地，飛騨山脈，白山）に分布する．

上野雄規氏（白石市），高橋和吉氏（大崎市），葛西英明氏（仙台市），杉山多喜子氏（名取市），加藤信英氏（鶴岡市），高橋信弥氏（東根市），土門尚三氏（遊佐町），蓮沼憲二氏（会津若松市）の方々には現地調査の案内をしていただくとともに，国立科学博物館維管束植物標本庫 (TNS) に標本並びに生態写真をご寄贈いただきました．ここに記して感謝の意を表します．

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